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ABSTRACT

Work oriented education has been tied to national development in Malaysia since the 1960's. Increasing population, unemployment, and shortages of skilled manpower led the government to relate education more closely to work and develop technical and vocational education. Malaysia extended basic education to lower secondary manpower needs: and balanced general, vocational, and technical education. Under the system of mandatory prevocational training introduced at lower secondary levels in 1965, students receive both theory and practice in either industrial arts, agricultural science, home science, or commerce. Upper secondary students attend Technical Schools, which provide technically biased academic education leading to university studies or Vocational Schools, which develop employable skills and a vocationally biased education. Established in 1968, the 23 Vocational Schools provide fundamental scientific knowledge and broad-based skills in order to produce flexible workers adaptable to changing manpower needs. Two Polytechnic Colleges, training middle level engineering technicians and junior business executives, and several Teacher Training Colleges exist. Many nonformal education programs find acceptance among the large youth population. Government agencies, welfare institutions, and private industry provide a wide range of apprenticeships, training, and trade courses. (SB)

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

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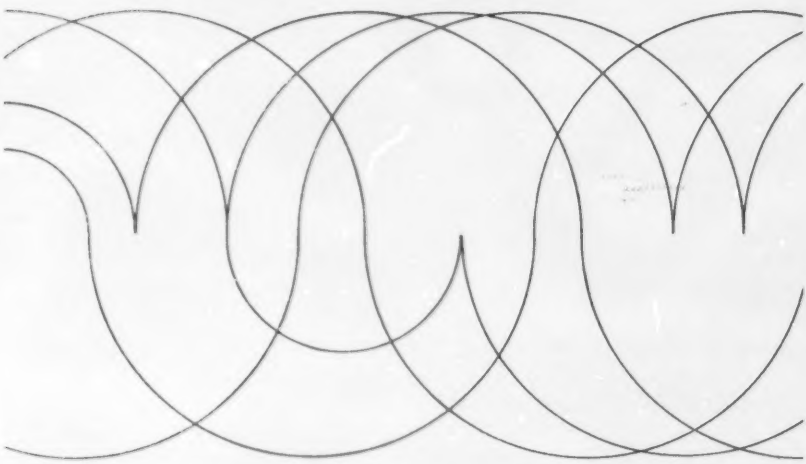

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

Malaysia

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PREFACE

Many countries in Asia and Oceania, as in other regions of the world, are engaged in reorienting their education systems. A basic concern underlying these efforts is to make education functional and relevant to the needs of the individual and of the society. It is increasingly felt that the education systems tend to get isolated from the larger social, cultural and development goals of the society. This isolation is engendered when the process of learning is separated from the context of action and work, and is nowhere as marked as in the failure of education to provide children and youth with an active comprehension of the world of work.

The response to the problem is reflected in a variety of programmes underway in several countries of Asia and Oceania. Considering the importance of the issue, the Fourth Regional Conference of Ministers of Education and Those Responsible for Economic Planning in Asia and Oceania (24 July - 1 August 1978, Colombo) has "Interlinking of Education and Productive Work" as one of the major themes of the Conference.

The country studies presented in the present series were received in response to Unesco's request to the Member States. By the time of going to the press, studies from twelve countries were received and they comprise the present series being issued on the occasion of the Fourth Regional Conference. The assistance of Unesco National Commissions in these countries in having the studies prepared and of the organizations and scholars who have been responsible for them is gratefully acknowledged. These studies cover a wide spectrum of experiences, ranging from experimental projects to comprehensive, system-wide programmes, and detailed descriptions are offered of one or more projects in actual operation. It is hoped to add to the series as more country studies become available.

Opinions expressed in this publication are those of the author and do not necessarily represent the views of Unesco.

PART I

A. General Description and Policy Trends

1. Introduction

In Malaysia, combining education and productive work is receiving much attention. The teaching of electives to all the students in the lower secondary classes illustrates the importance given to this concept of work-oriented education.

National development strategies have periodically recognized the importance of relating education to the world of work to meet the manpower needs of a developing country. The fact that a large number of government agencies is involved in education and training especially of the out-of-school population indicates further the stress laid on work-oriented education.

Education and training in both the formal and non-formal areas are aimed at providing the much needed manpower in the industrial, commercial, agricultural and other sectors. Co-ordination of all programmes at the national level is done by the Economic Planning Unit and the Implementation Co-ordination Unit in the Prime Minister's Department. At the inter-departmental and inter-Ministerial level co-ordination is done by such bodies as the National Advisory Council on Industrial Training and the National Industrial Training and Trade Certification Board. Periodic reviews and changes of educational policies and strategies are done by special committees and commission set up at national and other levels. As an illustration, a special high-powered Education Review Committee headed by the Deputy Prime Minister is currently reviewing the educational system with particular reference to meeting manpower needs; work-oriented education is also under scrutiny by this Education Review Committee.

In Malaysia, education and work experience are combined in a number of ways. In the schools system, a large number of students in the lower secondary classes are provided with work experience, with a view to introducing them to the world of work. This is a significant and important

innovation because it wears down the prejudice against blue collar jobs. The number of children involved is very large. A total of 523,490 students study Industrial Arts, Commerce, Home Science and Agriculture and are exposed in consequence to work experiences of one kind or another.

At the upper secondary level work-related education is provided at the Technical Schools and the Vocational Schools. The Technical Schools provide engineering-based practical and theoretical education for the more academically inclined students aspiring for university education, while the Vocational Schools provide education and training for those seeking to learn a skill in a trade. At the post-secondary level education with a work-based orientation is provided at the two Polytechnics and at the Teacher Training Colleges where teachers for vocational and technical schools as well as teachers to teach electives in the secondary schools are trained.

Outside the formal school system, work-oriented education or training is provided by government and private bodies including private schools. Government agencies provide such education and training in keeping with specific national objectives, especially to train the out-of-school youth population for useful jobs. Private schools provide, though not to a very significant extent, education and skill training in trade skills and commercial studies for school leavers and those who have left school early.

2. The Malaysian education system

Malaysian children start formal schooling at the age of six plus. Primary education is of six years' duration. Education at the primary level is free of any tuition fees and there is a textbook aid programme for the needy pupils. Pupils in the primary schools progress automatically year by year and there is no retention due to poor performance. All tests and examinations are of an evaluative nature.

All primary school students are allowed to proceed to lower secondary schools. Lower secondary education is of three years' duration. In the lower secondary schools, students are required to study at least one practical elective in addition to the core general subjects. The practical electives available in schools are Industrial Arts, Agricultural Science, Commercial Studies and Home Science.

At the end of the three years of lower secondary education students sit for the Lower Certificate of Education Examination. This examination determines whether or not a student may continue in the formal school system. Students who are successful in this examination are channelled, according to their abilities and interests, into Science, Arts, Technical or Vocational Streams.

Upper secondary education is of two years' duration in all streams. Students in the Science, Arts and Technical Streams take the Malaysian School Leaving Certificate Examination at the end of the two years. Those who do well proceed to another two years of pre-university studies. Others continue their studies at other institutions such as technician level educational institutions, teachers colleges, colleges of commerce, or seek employment. Students opting for the vocational schools are generally those who have not scored high marks in the Lower Certificate of Education Examination.

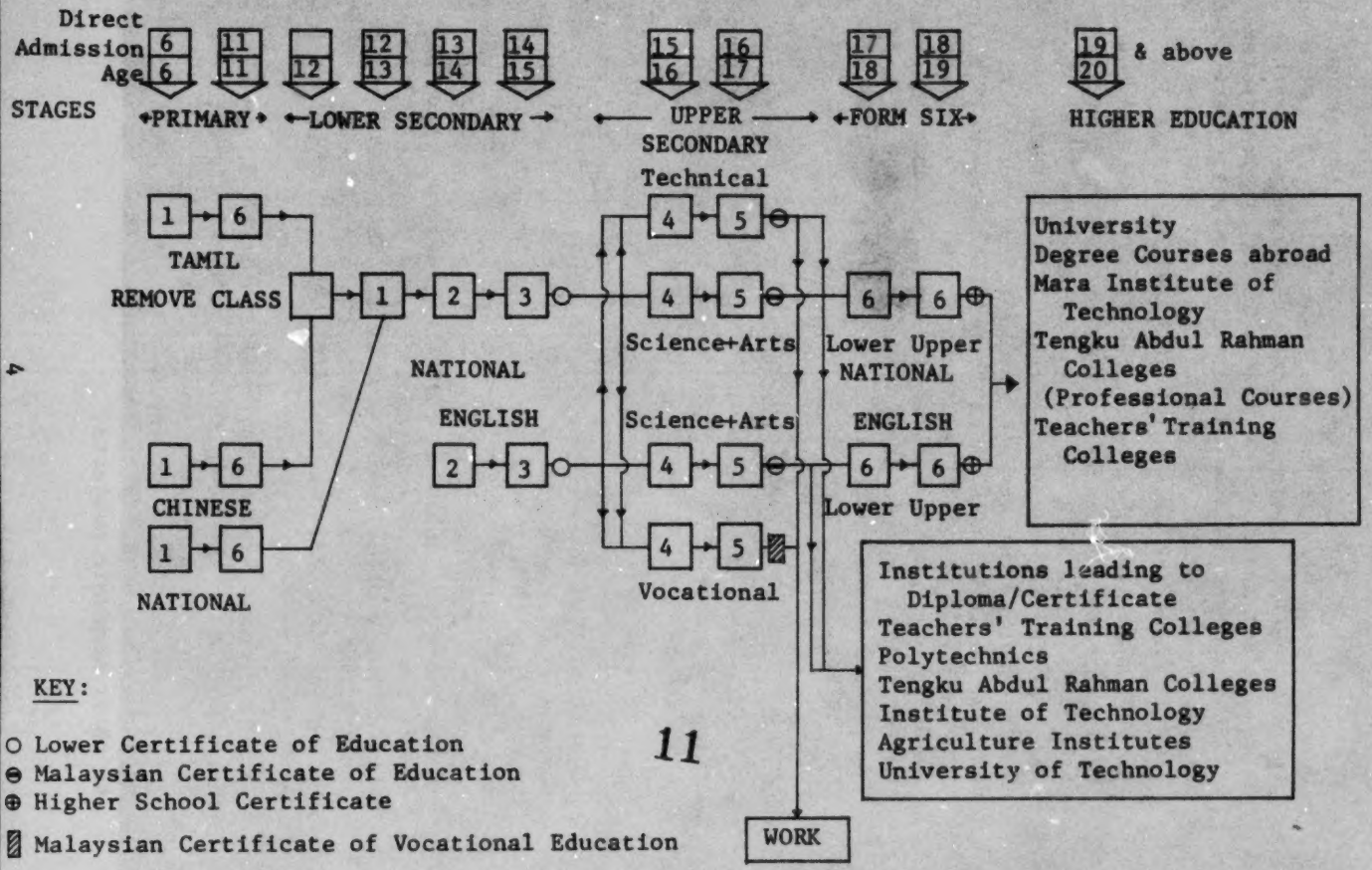
Technical and vocational education

Since Independence in 1957, the Government has been making strenuous efforts towards one major goal, i.e. to raise the general standard of living in this country.

A major setback towards the achievement of this goal has been the lack of technical knowledge and expertise in various fields including engineering, agriculture and commerce. Overseas aid in the form of technical experts from various countries was used as a temporary measure while Malaysia sought to build its own expertise for economic development. This had necessarily to be a long-term project. The Ministry of Education was determined to spread and popularize technical education for the purpose of training upper level professionals as well as the lower level technicians and craftsmen. It was with this objective that the Ministry of Education set up its Technical Education Division in 1964.

In 1965, the Ministry of Education introduced four new subjects at the Lower Secondary level under the Comprehensive Education System. These were, Industrial Arts, Agricultural Science, Commerce and Home Science. Students were required to study at least one of these in addition to their academic subjects.

Structure of the Educational System, Malaysia



KEY:

○ Lower Certificate of Education
⊖ Malaysian Certificate of Education
⊕ Higher School Certificate
▨ Malaysian Certificate of Vocational Education

Industrial Arts introduced the pupils to the using of machine tools such as lathes, drill presses, and hand-tools in the workshops; Agricultural Science to the techniques of modern farming; Commerce to the various aspects of business; Home Science was aimed at spreading basic education in the art of home management. Schools teaching Industrial Arts and Home Science were equipped with workshops, laboratories and equipment while those teaching agriculture were provided with agricultural equipment and land. On successful completion of Form III, students continued their study in the upper secondary schools - Form IV and V. Besides the ordinary academic schools, there were two other types of upper secondary schools; namely the Vocational Schools and the Technical Schools.

The aim of the Vocational Schools was (and still is) to provide a vocationally biased type of education. Basically, the vocational school is concerned with equipping students with employable skills. Students are given general education in Social Studies, Science, Mathematics and Languages. In addition, they pursue a vocational course from among Engineering Trades, Agriculture, Commerce or Home Science. On completion of the two year course, students are employed as Junior Technicians, Draughtsmen and Laboratory Assistants (trade courses) and Clerks and Typists (Commercial course). Home Science students are employable as Welfare Assistants and Stewards. Agricultural Science students are at present mostly employed by quasi-governmental bodies and as Field Assistants or Junior Research Assistants.

The Vocational School Certificate which is awarded to the successful candidate is equated to the Malaysia Certificate of Education for purposes of employment. It is not meant to prepare students for further studies, although outstanding ones may still further their studies at the Polytechnics.

The Technical School is, however, meant to provide a technically biased academic education, with a view towards developing aptitude in engineering. Besides the ordinary general subjects, such as languages, mathematics, science and social studies, students are introduced to subjects basic to the mechanical and civil engineering areas. These subjects are Engineering Workshop Practice, Geometrical and Mechanical Drawings, Surveying, Building Construction, Geometrical and Building Drawing. On

completion of Form V, several avenues are open to the students. If they do not intend to further their education, they can be employed as Draughtsmen, Clerks of Works in engineering firms or Technical Departments, or join firms for further technician training. Successful students can also continue their education in Form VI classes, the Polytechnics, the National Institute of Technology or the Technical Teachers' Training College. In Technical Schools emphasis is not placed on trade skill but rather on the necessary technical foundation for higher technical education.

Agricultural Science is also taught in Technical Schools. It prepares students for higher studies in Agriculture. The Commercial course is a forerunner of higher studies in Accountancy, Business Administration or Economics. Agricultural Science and Commerce were introduced in 1973.

The Ungku Omar Polytechnic in Ipoh and the Kuantan Polytechnic were established in 1969 and 1976, respectively, with the objective of meeting the country's increasing need for trained technicians. Higher grade technicians are being trained at the National Institute of Technology. In addition to Diploma Courses, the Institute is also conducting degree courses in engineering.

3. The development of comprehensive education in Malaysia

In order to understand how the trend towards work-oriented education has developed in Malaysia it is necessary to trace the development of comprehensive education which led to technical and vocational education in its present form and emphasized the idea of linking education more closely to the world of work.

In 1963 a professional committee was established to review the primary-to-secondary promotion examination and the newly established Secondary Continuation Schools. This committee reviewed the whole system of education in the country and recommended that the primary-to-secondary promotion examination as well as the secondary continuation school system be abolished. It further recommended a major change in the structure of secondary education by the introduction of comprehensive education at the lower secondary stage. The recommendations were accepted by the Government and at the beginning of 1965 the comprehensive education system was introduced in this country. Briefly, the comprehensive education system is as follows:

- All pupils receive 9 years of education comprising 6 years of primary education and 3 years of lower secondary education i.e. Form I, Form II and Form III. An additional year in a 'Remove' class is included where pupils undergo a change in the medium of instruction.

- On completion of 6 years primary education, the pupils automatically proceed to the 7th, 8th and 9th year of education without having to take an entrance examination for admission into secondary education.

- From the 7th to 9th year of education the pupils undergo both a general and pre-vocational education which is to help them find their own aptitudes and interests and the type of education, academic or otherwise, that will best meet with their ability. The course consists of a core curriculum, and the pre-vocational education comprises subjects such as agriculture, commerce, home science and industrial arts.

- Pupils are selected for academic, technical, or vocational education on the basis of the results of the Lower Certificate of Education Examination. As a result, Standard 6 pupils are promoted automatically to Form I of the Remove Class and undergo a new type of education where selection for the different types of upper secondary education is made, after the Lower Certificate of Education Examination.

In May 1965, a professional committee on post-comprehensive education was appointed to make recommendations on how upper secondary education be implemented in this country.

Structure of post-comprehensive education

The professional committee set up in 1963, while recommending the introduction of comprehensive education, had also suggested a new structure of post-comprehensive education, and in accepting this Report, the Government also accepted in principle this recommended structure of post-comprehensive education.

Combining education and work

In its Report the professional committee of 1965 said:

> It is realized that not all children are the same in their attainment, attitude, and aptitude. The existence of this natural difference between individuals and the difference in their rates of development, especially mental development will remain. For this reason a system of streaming will remain indispensable. At one point or another the pupils should be streamed in accordance with their ability, aptitude and interest. This must be necessarily so but it is the view of the committee that such streaming should be delayed to as late an age as possible to a period when the pupils can be given the maximum opportunity to develop their potential through the process of formal education. Then, such streaming will also be to the advantage of the Nation, for the Nation could then embark upon a plan to develop the potential wealth - intellectual wealth and manual skills - inherent in its rising generation - a true investment for the future of the Nation....

and further:

> On the basis of the Lower Certificate of Education result pupils are then selected for academic, technical, agricultural, commercial or trade schools. Thus by the time they complete post-comprehensive education - an education beyond the initial 9 years - the majority of pupils will have received training for a specific calling and will also then be about 17 or 18 years of age, a suitable age for employment in commerce, industries or agriculture.

Subsequently, a third committee was set up. It was called the professional committee on Post Comprehensive Education. This committee agreed with the views of the 1963 committee that it is essential to have streaming for upper secondary education and that this streaming should be made on the basis of the Lower Certificate of Education examination results except that "academic, technical, agricultural, or trade schools" be classified under two broad fields of "general and technical education", and "vocational education".

This committee further made the following recommendations which were accepted by the Government:

That the post-Comprehensive Arts and Science Education be basically similar to the system of upper secondary education where the pupils are prepared for a purely academic type of education with limited of Education/School Certificate examination, with provision for some of the pupils to go into the 6th form, colleges, and universities.

That the Post-Comprehensive Technical Education (engineering) be similar to that of the existing secondary technical schools except that the course itself be reduced to 2 years, and that the core subjects be the same as for arts and science streams but to include "electives" such as building construction, engineering, workshop practice, mechanical, building drawing, electrical technology and surveying.

That in the case of Post-Comprehensive Agricultural Education, the course be of two years, duration. The core subjects will also be similar to that of the arts and science streams and the "electives" include agricultural science, biology and chemistry.

That Post-Comprehensive Commercial Education be of two years' duration but this course should be academic in nature and that the core subjects be similar to the core subjects in the arts and science stream but the "electives" include such subjects as commerce and principles of accounts.

That Home Science Education include elective subjects such as needlework and dress-making, cookery, general housecraft and that the core subjects be the same as for the arts and science streams.

Vocational education

The only type of vocational education provided in 1965 was that given in the secondary trade schools and the course was of three years' duration. The committee recommended that the scope of vocational education be widened to include not only trade but also agriculture, commerce and practical home crafts. It further recommended that vocational education be of two years' duration instead of three and that the courses in vocational schools be practical in nature, leading to gainful employment or self-employment with provision for some of the better students to enter colleges.

In order to maintain standards, the committee recommended that a certificate called the Malaysian Vocational Certificate should be awarded to those pupils who successfully complete the two year vocational course.

Thus, it can be seen that technical and vocational education as it is provided now in the secondary schools grew out of the comprehensive system of education. The idea was, while making allowance for the different attitude, aptitude and ability of students at the lower secondary stage, to provide at the same time training in specific areas to meet manpower needs at the post-comprehensive stages.

4. Work-oriented education in national development plans

Work-oriented education gained an important niche in all the three national development plans (1965-1980).

In the First Malaysia Plan the comprehensive education system was spelt out as national policy. The need to provide more vocational and technical education was clearly stated. The strategies included:

the extension of the concept of basic education to include not only the primary cycle but also three years of lower secondary education;

the reorganization of the pattern of secondary education with the introduction of comprehensive and post-comprehensive education; and

the shift towards a better balance between general academic education, on the one hand, and vocational, technical and science education, on the other.

The increase in population and the demand for greater employment opportunities led the government to question the role of pure academic education in providing employment for school leavers.

Table 1. Percentage of male members of the labour force in West Malaysia who are unemployed, by educational qualification, according to surveys conducted in 1962 and in 1967/68

Educational Qualification	Per cent Unemployed 1962[1]	1967/68[2]
Non formal education	3.1	3.09
Primary	5.3	6.05
Forms I and II	9.4)	15.43
Form III	10.9)	
Form IV	12.1)	15.67
Form V	6.7)	
Form VI	9.5	12.02
University	0.04	3.13
All educational groups	5.2	7.20

A report published in 1962 by the Department of Labour and Industrial Relations and the Department of Statistics showed that the rate of unemployment was higher among pre-university school leavers than among members of the labour force with no formal education at all. This generalization was confirmed by the "Socio-Economic Sample Survey of Households - Malaysia 1967/68" (Choudhry 1970). Both surveys indicated the general disadvantage of formal general education in obtaining employment. The data from the two surveys are presented in the table above.

The results of these and other surveys called to question the value of non-vocational education in Malaysia. The Report of the Higher Education Planning Committee (1967), citing the results of the 1962 study, lamented that general education leads people to be "choosey", unresponsive to employment opportunities, and lacking in practical training which would make them more employable.

1. Department of Labour and Industrial Relations and Department of Statistics.

2. Choudhry, 1970: 120.

Combining education and work

As a result of these findings, the Ministry of Education began a reappraisal of general education with a view to enhancing its vocational utility at all levels and of expanding the technical and agricultural sector of secondary education.

The Government foresaw that unemployment could be reduced by "further investments in some levels of education, aims and curricula, and in vocational counselling services".

In the Second Malaysia Plan (1971-1975), therefore, the Government stated that "while economic expansion will have to proceed vigorously to provide productive employment for school-leavers, the education and training systems will have to be geared more effectively to enhancing such absorption and to producing adequate numbers of those skilled personnel necessary for the implementation of the New Economic Policy".

It was also felt that besides having a strong manpower orientation, education and training programmes would contribute significantly towards promoting national unity. They would, in addition, play a vital role in increasing the productivity and income of all Malaysians, as well as in the greater urbanization of the Malays and other indigenous people by facilitating their participation in modern economic activities.

To this end it was decided that education and training programmes should be aligned more closely with the expected pattern of labour demand. While increased educational outputs were clearly enhancing the capability and quality of the labour force, over-expansion of higher levels of education could pose problems of educated unemployment of serious proportions. The objectives of the New Economic Policy, however, required that these segments of the education and training systems be reviewed to enable the entry in greater numbers of presently disadvantaged groups into highly productive modern sector employment. The education system and vocational training programmes were therefore co-ordinated closely to avoid waste of scarce teacher and financial resources and to meet the requirements of public and private sector enterprises more effectively.

Meeting manpower needs

One of the important requirements of social, economic, agricultural and industrial growth of the country is

the availability of a sufficient number of well-trained manpower at all levels. In order to supply the raw materials for this much needed manpower, technical and vocational education is being developed and expanded to ensure the technological bases of economic development and expansion.

Projections based on the Manpower Survey undertaken by the Economic Planning Unit in the Prime Minister's Department indicate that there is an acute shortage of skilled manpower both in the public and private sectors for the period 1973-1980.

The survey has identified the demand for skilled workers at craftsmen level in the private sector as follows:

Production workers	381,644
Technicians	10,015
Clerical and Commercial workers	185,836
Agricultural workers	296,246
Sales and Service workers	57,044
Total:	930,785

But the output from vocational schools, the major source of workers at this level, will be insufficient as the figures below indicate.

Estimated enrolment of vocational schools 1976-1980:

	1976	1977	1978	1979	1980	Total
Trades	5,570	6,280	6,480	6,880	7,300	32,510
Agriculture	540	600	660	720	780	3,300
Commerce	1,280	1,540	1,640	1,640	1,640	7,740
Home Science	780	840	900	960	1,020	4,500
Total	8,170	9,260	9,680	10,200	10,740	48,050

While the vocational schools are by no means the only training agency for craftsmen, they nevertheless form the largest source of supply of this type of manpower. There will thus continue to exist for some time a critical shortage of skilled manpower at the craftsmen level. The need for the expansion of technical and vocational schools is therefore great.

Reducing unemployment among school leavers with general education

Apart from the need to expand technical and vocational education to meet the increasing need for skilled

craftsmen, there is also the urgent need to increase the ratio between vocational school enrolment and the upper secondary enrolment as recommended by the Higher Education Committee.

Education has to be closely related to working life and the realities of employment, and technical and vocational education must be expanded and broadened if the ever increasing numbers of unemployed school leavers with only general education are to be reduced. Skill acquisition by pupils will arrest the present trend where too many terminate their education at too early an age and without knowledge and skills that would enable them to find employment.

The Third Malaysia Plan

In the Third Malaysia Plan (1976-1980) it is national policy to expand the supply of skills at all levels to meet the manpower needs. This is to be done by expanding the training capacities both in the school system and in non-formal education. It is also the intention to improve the quality of training and skill development through various measures.

The education and training objectives under the Third Malaysia Plan are as follows:

Strengthen the educational system for promoting national integration and unity through:

- the continued implementation, in stages of Bahasa Malaysia as the main medium of instruction at all levels;
- the development of personality, character and good citizenship and the promotion of moral discipline through curricular and extra-curricular activities;
- narrowing the gap in educational opportunities between the rich and poor, and among the various regions and races in the country, through a more equitable distribution of resources and facilities;
- the eventual integration of the educational systems in Sabah and Sarawak into the national system;

- the orientation and expansion of the education and training system towards meeting national manpower needs, especially in science and technology;
- the improvement of the quality of education in order to reduce wastage and increase its effectiveness for nation building; and
- the expansion of the research, planning and implementation capacity to meet the above objectives.

The Third Malaysia Plan further states that:

> The scientific, technical and vocational content of education at the secondary level will be increased as teacher resources expand. Significant efforts will be made to increase the output of engineering, medical and agricultural manpower at all levels. Existing programmes of the National Productivity Centre, Majlis Amanah Rakyat (MARA), and the National Institute of Public Administration as well as the tertiary institutions in management development and training will be considerably strengthened.

A more active role of industry in relating education and training to productive work is proposed in the Plan:

> Skill formation requires close co-operation between the public and private sectors in the formulation and implementation of the required training programmes. A more active role by the private sector is necessary to ensure that training is directly related to the needs of employment. During the Plan period, industrial training as provided by the Government will undergo major changes. This is designed to improve the content and relevance of training as well as provide for the possitive involvement of the private sector. In addition to the expansion of training programmes within the public sector, opportunities for on-the-job training in industry for youth will be considerably expanded in consultation with the private sector... In order to effect closer co-ordination between the public and private sectors, a National Industrial Training Council, with representation from both

sectors, will be established under the Ministry of Labour and Manpower. It will be the responsibility of the Council, among its other functions, to formulate recommendations for the financing of industrial training with a view to increasing private sector participation and involvement at all levels of the training process. The work of the National Industrial Training and Trade Certification Board in the establishment of trade standards and the formulation of national training syllabi for the various industrial trades will also be intensified. Specific studies on the employment experience of graduates from training institutions will be undertaken to improve the quality of training programmes.

The Plan intends to promote the teaching of science and mathematics at primary and lower secondary levels through the increased provision of teaching materials and expansion in the number of science and mathematics teachers. Enrolment in science, technical and vocational courses at the upper secondary level is to be expanded to account for 51.6% of total enrolment at this level in 1980 as compared to 39.4% in 1975.

In the expansion of higher education, priority will be given to diploma level courses, so as to remedy existing imbalances in enrolments between diploma and degree courses and to meet the sizeable demand for manpower at the sub-professional level. Engineering, science, medical, agriculture and business courses will be emphasized. A similar importance will be given to industrial vocational training for employment in commerce and industry.

It can thus be seen that the government plans to orientate and expand the education and training system towards meeting the increasing national manpower needs, especially in technology. To this end, technical, vocational, and science education will receive greater attention and impetus.

5. Inter-Ministerial and Inter-Departmental Co-ordination

Education in Malaysia is a Federal matter. The centralization of authority makes co-ordination relatively easy. The Technical and Vocational Division of the Ministry of Education is charged with the task of planning, organizing, developing and supervising technical and vocational education within the school system as well as at the

polytechnic and teacher training levels. Co-ordination at the central level is done by this Division. There are also two high level committees - the Education Planning Committee headed by the Minister of Education and the Central Curriculum Committee headed by the Director-General of Education - where policy and curriculum matters are co-ordinated and decided.

Co-ordination at the national level is done through the Implementation Co-ordination Unit and the Economic Planning Unit at the Prime Minister's Department.

Co-ordination at the inter-departmental and inter-agency level is effected through the National Advisory Council on Industrial Training. The objective of the National Advisory Council on Industrial Training (NACIT) is to advise on training measures to improve the quality of the labour force so as to ensure more rapid development of the economy, bearing in mind the need for special training schemes for Malays and other natives; through greater participation of these groups in industries it is hoped that the existing racial imbalances in occupations will be progressively corrected.

The functions of NACIT are, inter alia, as follows:

- To advise and provide information on requirements of skilled manpower for industry in the short and long term;
- To advise and assist Government in its endeavours to resolve problems concerning the training of skilled manpower;
- To advise and assist Government in mobilizing private sector resources and facilities in the development of skilled manpower.

The National Industrial Training and Trade Certification Board also works closely with the Technical Division of the Ministry of Education. The NITTCB however co-ordinates the activities of training agencies outside the schools system as well. The objective of the NITTCB is the development of skilled manpower resources, particularly in respect of rectifying the nation's economic imbalance by:

- Assuring that the country's labour force will develop the skills and mobility required to meet the growing demands of the industrial sector;

- Co-ordinating efforts to provide opportunities to those entering the labour market to obtain employable skills or to up-grade skills already possessed;
- Improving communication techniques and skills of trainers and supervisors so that technology and skills can be effectively transmitted; and certifying the competence of industrial craftsmen throughout the country.

There is thus the machinery to co-ordinate the efforts of the various training agencies so that these are not duplicated and wasted. From time to time the co-ordinating machinery is reviewed and improved.

B. Programmes for Combining Education and Work Experience within the Formal System of Education

1. Pre-vocational education

Pre-vocational education was introduced into the secondary school system in 1965 in an effort to provide some basic information and knowledge of technical and vocational education and prepare the pupils to understand the modern world of work.

This pre-vocational education consists of 4 electives, namely industrial arts, agricultural, commerce and home science. It is different from traditional handicraft courses which were conducted primarily to teach manual and artistic skills. Pre-vocational education is also different from vocational education in that it is not a preparation for employment in an occupational field.

The 4 electives were designed as part of general education in the lower secondary classes. They were intended primarily to serve as a general introduction to the world of modern technology, while at the same instilling in the pupils some basic theoretical concepts and affording practical experience in the use of tools and materials in the technical, agricultural and commercial fields. It was also hoped that pupils will develop useful habits and attitudes and be guided in selecting a suitable vocation. The electives were, however, not meant to train pupils in specialized skills, as in vocational education.

The teaching of electives has given the pupils a greater appreciation of the nature of the modern world of technology. It has also helped to guide students in the lower secondary classes with the right interest and aptitude into vocational and technical schools at the upper secondary level. More and more pupils are now seeking to pursue courses in technical and vocational areas, as the prejudice against manual work is slowly being removed.

A more detailed account of this pre-vocational education programme is given in the second part of this report under "Project Reports".

2. Vocational education

The Ministry of Education provides vocational education to suitable students who have completed lower secondary education. Although the main aim of vocational education is the development of employable skills in students they are also given general education such as languages, social studies, science and mathematics. The vocational education course is a two-year full-time one, at the end of which students offer themselves for the Malaysian Vocational Certificate Examination. Vocational education is provided in separate secondary vocational schools.

Within the school system itself, practical arts such as bookkeeping, basketry and elementary woodwork were taught in some primary schools in the early nineteen twenties. But it was not until 1926 that the first Trade School for Craft Education was established in Kuala Lumpur. Three similar Trade Schools subsequently opened in Penang, Ipoh and Johor Bahru. These schools provided a three-year course for the training of mechanics, electricians and carpenters, at post-primary level, i.e. after six years of primary education. In 1946, the name of Trade Schools was changed to Junior Technical Trade Schools.

The admission requirement to Junior (Technical) Trade Schools was raised to three years of lower secondary education in 1960 when the recommendations of the Education Review Committee were implemented. The schools were also renamed "Secondary Trade Schools" as recommended by the Report.

With the introduction of comprehensive education in the lower secondary schools in 1965, additional vocational courses were introduced such as Industrial Arts, Agricultural Science, Commerce and Home Science.

Combining education and work

The Rural Extension Schools also offered vocational courses of three years' duration in metalwork, carpentry, brickwork, vegetable farming, poultry farming, animal husbandry and rubber tapping. Two such schools started in 1957 and this figure increased, by 1964, to 13 schools catering for about 1,200 students. The completion of 6 years of primary education was the admission requirement. At the end of the three-year vocational course, the students sat for the Lower Certificate of Education Examination, or continued their studies in the Secondary Trade Schools. These schools (Rural Extension Schools) were slowly phased out. By 1967, together with Secondary Trade Schools, they were renamed "Secondary Vocational Schools", with about two-thirds of the time allocated to vocational subjects and one-third to general education. In 1971, the curriculum was further revised to increase the skill of the students, and the time for vocational subjects was increased to about 75% of the total schooling time.

Vocational schools

The objective of Secondary Vocational Schools is to provide the commercial and industrial sectors with manpower equipped with basic skills and knowledge at the craftsman's level. The curriculum relating to vocational content is kept very flexible and broadbased so that courses can be varied to reflect the changing needs. The Secondary Vocational Schools provide education and training to students in four areas:

- Engineering trades
- Agriculture
- Commerce
- Home science

These schools normally receive students who do not intend to continue schooling beyond the upper secondary level (eleven years of schooling) and plan to seek employment as craftsmen and operatives in the above-mentioned economic sectors of the country. These students are in many cases those who have not scored very highly in the Lower Certificate of Education Examination.

Students in these schools choose one practical skill area to study in addition to the general subjects. The practical skill areas are as follows:

Carpentry and joinery
Bricklaying and masonery
Sheetmetal work and welding
Machining and fitting
Automechanics (petrol and diesel)
Refrigeration and air-conditioning
Electrical installation practice
Radio and TV servicing
Agriculture - comprising of:
  Crop production
  Ornamental horticulture
  Soil management
  Livestock production
  Farm management
  Farm tools and machinery
Commerce - comprising of:
  Shorthand and bookkeeping
  Commercial practice
  Typewriting
Home science - Course A:
  Nutrition
  Cookery,cottage industry and catering
  Mothercraft and child care
  Elements of commerce
Home science - Course B:
  Needlecraft and tailoring
  Beauty culture and hair dressing
  Laundry work
  Elements of commerce

The general education component in these schools is made up of the following subjects: Bahasa Malaysia (national language); English language; Mathematics; Science; Social studies; Religious instruction. Of the school time, 73% is devoted to the teaching of the technological subjects, 15% to the teaching of mathematics and science, and 12% to the other subjects. On completion of the course, students from these schools seek employment. However, a small percentage of the top performers go on for future studies.

These schools are located in areas of agricultural, industrial and commercial centres. This is to allow the students to be near the areas where their particular technical skill is being employed. This not only helps the students to gain first-hand knowledge of the working conditions, but also allows them to seek employment. In order to help students who may come from distant areas, the schools provide boarding facilities.

Combining education and work

The Ministry of Education through its Technical and Vocational Education Division prepares a common curriculum for the Vocational Secondary Schools and provides the same type of equipment to them. Time allocation for the study of the various subjects is also centrally determined. Training of teachers and instructors is also carried out by the Technical and Vocational Education Division and the Teacher Training Division of the Ministry. Research and evaluation in technical and vocational education is done on a very small scale through the cooperation of the Technical and Vocational Education Division, the Educational Planning and Research Division, and the Federal Inspectorate of Schools.

The main trend in technical and vocational education is towards making such education available to all segments of the school population. In keeping with the principle of life-long education, the Ministry tries to provide general education along with occupational skills. This is to ensure that students who have decided to opt out of the general education stream are not confined to a life of just labouring at a particular job without being able to improve themselves.

New teaching technologies are being tried out and attempts are being made to relate the Science, Mathematics and Language studies to the technological skills being imparted. A definite attempt at doing away with compartmentalized teaching of the various subjects is being made.

In the development of skill training syllabi, attempts are being made to increasingly involve the people in the various industries. This implies not only finding out what kind of skills the industries need, but also what kind of attitudes and outlooks the community as a whole requires.

3. Technical education

The Technical School is an upper secondary school, offering courses with a science and technical bias to students who have passed the Lower Certificate of Education with creditable grade 'A' certificates, and who show an aptitude for an education with a technical bias.

The objectives of the Technical Schools are:

- To provide basic technical education to enable the students to seek employment in industry or to further their education in higher technical institutions up to the university level;

- To provide scientific and technical education to students with an aptitude for such subjects and to foster and maintain that interest;
- To raise the level and standard of skilled manpower in the expanding industrial and commercial sectors in the country.

Four types of technical course are offered by the Technical Schools. They are:

- Building course
- Mechanical course
- Commerce
- Agriculture

In both the Building and Mechanical Courses, students are required to do at least two and a half hours of practical work per week. In Mechanical Engineering Workshop Practice, for instance, students are given practice in the use of Bench and Fitting Tools and are expected to reach a certain level of proficiency in the operation of various machine tools, such as the lathe, shaping and milling machines. Approximately an hour and half a week is spent on theoretical work, covering topics such as hand tools, machine tools, forging, machining, fitting, lubricants and heat treatment, etc.

In Building Construction, students learn such skills as the use of hand tools and the operation of various woodworking machines such as band saw, surface planner, etc; various types of bends, arches and piers in brickwork. About one and a half hours is devoted to the theory of Building Construction covering topics such as bends and arches; foundations; construction of floors, roofs, staircases; painting, and plumbing. Surveying includes both theory and field work. Students are taught to handle surveying instruments such as the chain, prismatic compass, the plane table, dumpy level and the theodolite.

Two commercial subjects may be taken, namely Commerce and Principles of Accounts. These two subjects are an extension of the Commercial Studies at the lower secondary level. Commerce includes structure of the business world including retail, wholesale, import and export, insurance, banking, advertising and transportation. The Principles of Accounts include the application of the double entry principle to present day recording of business transactions.

Combining education and work

In the Agricultural Course, a new syllabus was introduced in 1972 and this subject is a continuation of the lower secondary Agricultural Science. The course generally covers the various fields of Agriculture like Crop Production, Livestock, Soils and Machinery.

Teachers, enrolment and facilities

The Technical Schools are equipped with specialized facilities. Well equipped laboratories are available to meet the requirements of the current syllabus for the teaching of Chemistry and Physics. There are also fully equipped workshops for Mechanical Engineering Practice, Woodwork and Masonry. Large and well equipped drawing rooms are available for technical drawing practices. For Surveying the schools have a complete range of instruments and equipment necessary for the teaching of this subject.

Technical schools have been expanding and there are 11 schools today. The expansion and enrolment of Technical Schools is shown below:

Year	No. of schools	Enrolment
1968	3	1,357
1972	4	2,116
1977	9	5,430

Teachers for the Technical Schools are for the most part university graduates. They are engaged mainly in the teaching of Mathematics, Science and other general subjects. Technical subjects are generally taught by Diploma holders of the National Technical University and by teachers trained at the Technical Teacher Training College. Commerce and Agricultural Science are also taught by university graduates.

4. Polytechnic education

There are two polytechnics in Malaysia. The first polytechnic was established in 1969, and the second in 1976, for the purpose of training technicians and junior executives in the engineering and business enterprises, respectively.

The technician in Malaysia as everywhere else in the world is expected not only to be skillful in the practice of his field but also to have sufficient theoretical background knowledge to enable him to serve as a useful link between the engineer and the craftsman. Hence at the polytechnic every endeavour has been made to provide the students with

as much practical and laboratory work as possible and this is sufficiently balanced by classroom teaching.

In addition, polytechnic students also undergo a six-month industrial training period immediately after successful completion of the first year. The industrial training is carried out in private and government industries all over the country. This training is to enable each student to experience the actual working life and to appreciate the application of engineering and management knowledge in industry. At the end of the industrial training each student submits a report of what he has done. This is taken into account when his overall performance is considered at the end of the final year.

Courses

The polytechnics provide full-time courses in engineering technologies and business studies. Normally the courses are of 2 years but the course in accountancy is 3 years. Certificates of the polytechnic are issued to candidates who successfully complete the courses. The 3 year course in accountancy leads to a diploma.

The courses provided are as follows:

- Electrical engineering (Power)
- Electrical engineering (Electronics and communications)
- Electrical engineering (Industrial instrumentation and control)
- Mechanical engineering (General)
- Mechanical engineering (Production)
- Mechanical engineering (Automotive and diesel)
- Mechanical engineering (Air conditioning and refrigeration)
- Mechanical engineering (Marine)
- Civil engineering (Construction)
- Civil engineering (Public works and hydraulics)
- Civil engineering (Architectural drafting)
- Business studies (Malay medium)
- Business studies (English medium)
- Accountancy

The qualifications for admission into the polytechnics are the Malaysia Certificate of Education or the Malaysian Vocational School Certificate.

Combining education and work

Although the polytechnics are specially designed to meet the nation's requirements for technicians and junior executives there is every opportunity for the good graduates to further their studies elsewhere. The polytechnic's certificates and diploma are being recognized as meeting the basic entry requirements of some institutions of higher learning both locally and abroad.

Teaching staff and enrolment

The teaching staff consists of university graduates; college graduates; and graduates of Instructor Training Institute.

The enrolment at the polytechnics has been increasing steadily over the years and is expected to reach 2,500 by 1985:

Year	Total enrolment
1969	261
1971	491
1973	1,047
1976	1,251
1977	1,475

The polytechnics are playing a very valuable role in meeting the nation's need for skilled workers at the middle level and the need for junior executives. Their graduates are being rapidly absorbed into industries where the need for technicians is increasing.

5. Teacher training programmes

Trades and commerce teachers

Teachers to teach technical and vocational subjects and electives are trained in Teacher Training Colleges. The Technical Teachers Training College, established in Kuala Lumpur in 1962, trains trades and commerce teachers.

There are three types of courses available in the college:

- Industrial Arts Teachers Training Course
- Trade Teachers Training Course
- Commercial Studies Course

Each of the above courses is accompanied by basic subjects. These consist of: Principles of Education; Languages -

Bahasa Malaysia and English; and Physical Education and Health Science.

Each teacher trainee also takes one elective subject, either music or art and craft, or library science.

The Industrial Arts Course, a two year course, is meant for training general purpose teachers of Industrial Arts subjects in Form I, II and III to meet the needs of the comprehensive school system of education in Malaysia. The course subjects undertaken by trainee teachers are General Metal Drafting, Woodworking, Electricity and Power Mechanics.

The Trade Courses extend over a 3 year period and teachers are trained to teach students at vocational schools in seven trades. Each trainee teacher will specialize in one of these trades. The seven Trade Courses are:

- Electrical installation and maintenance
- Radio and television
- Machine shop practice
- Sheet metal and welding
- Motor mechanics
- Building construction
- Air-conditioning and refrigeration

Each trainee in the Trade Course is required to complete twelve weeks of Industrial Training in his own field in selected workshops, factories or construction companies.

The Commercial Studies Course is a two-year course for the training of Commercial teachers for secondary schools.

The medium of instruction in all basic subjects (excluding English), as well as for the Industrial Arts and the Trade Courses is Bahasa Malaysia.

Agricultural Science Teachers

Teachers for Agricultural Science at the lower secondary level are trained at the Maktab Perguruan Temenggong Ibrahim in Johor Bahru. Teachers for the upper secondary classes are recruited from among university graduates.

The duration of training is two years where trainee teachers undergo courses in Professional Education, Languages (Bahasa Malaysia and English), Practical Teaching and Agricultural Science. The subject matter areas taught in Agricultural Science over the two years are:

First year	Second year
Science in agriculture	Soil science
Principles and practices of crop production	Crops
Principles of livestock	Livestock management
Farm mechanization	Farm mechanization
Horticulture	Horticulture
Soil science	Farm management
Methodology	Methodology
Practical: Vegetable gardening and project work	Practical: Practical experience in the following areas are given:
	Farm mechanization
	Livestock production
	Horticulture
	Laboratory work
	Farm work

Besides the above pre-service training, in-service training for serving teachers is also conducted at the college.

Home Science Teachers

Home Science Teachers are trained at the Temenggong Ibrahim College in Johor and the Women's Teachers College in Melaka. There are two types of courses - one for the training of General Home Science teachers to teach Home Science in the lower secondary classes, and the other for the training of specialist teachers of Home Science to teach the subject at the upper secondary classes.

The general course content includes Nutrition, Cookery, Housecraft, Needlework Laundry work, First Aid, Mothercraft and Child Care. Cookery and Needlework form the course content for the specialist course. About 100 teachers are trained each year in both courses.

C. Non-Formal Education Programmes Designed for Development of Productive Skills

The overriding objective of the New Economic Policy is national integration and unity. To achieve this objective, "education and training is oriented to meet the skilled manpower needs of the nation and to provide greater opportunity for education among those in the lower income groups and regions in the country".

At the same time, the Third Malaysia Plan seeks to re-orient the education and training system in order to be able "to equip youth with the knowledge and skills necessary for their effective participation in the development of the economy".

According to the 1970 Population Survey, 70% of the people in Malaysia are below the age of 30; 26% of these young persons fall within the 15-30 years age group. The problem then of providing sufficient programmes and training to utilize and realize the full potential of young people is immense indeed. While the Ministry of Education with its vast network of schools, colleges, and universities meets the educational and training needs of those in the formal system, those outside this system are generally looked after by the Ministry of Youth, Culture and Sports, the Ministry of Labour, the Ministry of Welfare and other Government as well as private agencies.

Numerous programmes are provided to train youths for employment, good citizenship and generally to improve their quality of life. The Ministries of Youth, Culture and Sports, the Ministry of Labour, the Ministry of Welfare Services, the Ministry of National and Rural Development, the National Goodwill Office, the Ministry of Education, the Ministry of Agriculture, the Ministry of Information, are some of the government agencies that provide such training for the out-of-school population.

1. Programmes under the Ministry of Youth, Culture and Sports

The Ministry of Youth, Culture and Sports, with the aim of giving out-of-school youths greater opportunities for employment provides technical, vocational, and leadership courses in its centres. The youths pursue one of a number of trades. The courses usually range from 6-21 months. On-the-job training is also provided.

While under training the youths are taught job skills, as well as social skills. There are ample opportunities for trainees to participate in recreational and social activities such as sports and games, debates, or group discussions. On completion of the course the youths find employment as skilled workers or artisans in government and private sectors. Many also set up business establishments of their own and become self-employed.

This skill training programme for youths is important, for it seeks to reduce socio-economic inequalities and to increase employment among the youths. It is a reflection of the genuine concern of the government for the problems and potentialities of the youths.

2. Programmes under the Ministry of Labour

The Industrial Training Institutes of the Ministry of Labour provide various kinds of training for out-of-school youth and employed workers. They are:

Preparatory Trade Courses: These are 22 week courses in engineering trades for those above 15 years of age.

National Apprenticeship Scheme: This is a 55 week course for workers sponsored by employers; the course is usually spread out over four years.

Skill Upgrading Course: This course aims at upgrading the skills of workers.

Tailor-Made Courses: These courses are specially designed to meet specific requests and needs of employers.

Large numbers of youths are trained at the I.T.I's.

3. Programmes under the Ministry of National and Rural Development

Co-operative education is the responsibility of the Education and Publicity Section, Department of Cooperative Development of the Ministry of National and Rural Development. The Department trains officials of co-operative societies, as well as workers and employees. It also seeks to ensure that members of co-operative societies give continuous and sustained support to their societies and tries to create an awareness among the populace, of the economic and social role of co-operatives and that co-operation is one of the accepted means of improving their economic and social conditions.

Co-operative education is carried out mainly by the Co-operative College, Petaling Jaya, which offers one year diploma courses as well as a one month basic course. The Education/Publicity Section of the Department of Co-operative Development organizes one day courses and seminars, in co-operation with State and District Departments.

The Community Development Classes and Women's Training Programmes are two aspects of the community development effort of the Ministry of National and Rural Development. The Community Development Division of the Ministry seeks to improve the economic and social condition of the rural community by:

- Community Development Classes with emphasis on acquiring skill and building up knowledge and expertise of the rural community so as to get their full participation in government development programmes;
- Having projects which encourage community participation with the aim of arousing initiative, self-reliance and the sense of ownership and belonging to the particular project; and
- Giving training to village leaders with the aim of explaining the national goals and aspirations so that they can become progressive leaders at grass-root level. These trained leaders are expected to spread education and knowledge, so obtained, to the rural community.

The Community Development programmes include Home Economics Classes, Child Care Centres, Semi-Occupational Classes (Vocational Classes), and Romanized Literacy Classes. Home Economic Classes and the Child Care Centres are run by village workers trained at Women's Training Institutes. There are 4 such Institutes at present, three of which are running basic home economics training courses and the fourth is engaged in giving advanced home economics and child care courses. At the Institutes, girls are given training in Home Economics for a period of three months, at the end of which they return to their villages to start Community Development Classes in Home Economics.

4. National Goodwill Office of the Prime Minister's Department

The National Solidarity Classes programme of the National Goodwill Office at the Prime Minister's Department encourages more non-Malays to study Bahasa Malaysia, in order to promote goodwill and national solidarity. Its objectives are:

- to enable Malaysians of all racial origins to communicate with one another in the national language;

- to cater for those who failed in the national language in the formal education system so that they can have a fresh opportunity to master the language;
- to inculcate in the minds of the participants the virtues of loyalty and good citizenship so that they can plan a more constructive role in our democratic way of life.

In these classes, the emphasis is on oral or spoken language as a first step towards proficiency.

5. Further Education Programme of the Ministry of Education

The Ministry of Education provides further education for those who are not attending school, i.e. school dropouts, those who have left or missed school and those who wish to improve their knowledge and skill in general, technical or commercial education. Further Education Classes are open to those who:

- being over-aged, are not permitted to continue to receive primary or secondary education in assisted schools;
- have had some education but have not completed their primary or secondary education;
- are in employment and wish to improve their skill and raise their standard of general, technical or commercial education.

Courses provided lead to public examinations, i.e. the Lower Certificate of Education, the Malaysia Certificate of Education, and the Higher School Certificate. Those who pass these examinations can secure employment, re-enter the school system or seek admission into colleges and universities.

The Further Education programme comprises 4 types of courses:

- General Education (Form III to Form VI)
- Commercial Education (Preliminary, Intermediate, Advanced)
- Technical Education (Preliminary, Intermediate, Higher)
- Special Education for the deaf (at Primary and Lower Secondary level of General Education).

6. Programmes under the Ministry of Agriculture and Lands

The Veterinary Division of the Ministry of Agriculture and Lands seeks to improve the quality and productivity of Malaysian livestock. It encourages the services and multiplication of all classes of livestock, keeping in view the country's requirements of fresh meat, milk, poultry and eggs; the need for draught animals for ploughing and maintenance of soil fertility; and the need for increased animal proteins and fats in the diets of local population.

Classes run by this Department teach poultry husbandry. Theoretical training includes table poultry processing and marketing, breeding of poultry, nutrition and diseases. The practical side of the course emphasizes breeding and brooding management and incubation.

7. Non-Formal Education in Welfare Institutions

The Ministry of Welfare Services runs welfare institutions, especially for juvenile offenders, the physically handicapped and women and girls exposed to moral danger.

Non-formal education in welfare institutions aims at:

- preparing the residents for life generally;
- improving work skills, learning work habits and attitudes to increase one's potential for using equipment;
- promoting national unity in a multi-racial society;
- assisting in reducing illiteracy in the country.

Educational programmes run by the Welfare Services may be broadly classified into remedial programmes, extension literacy schemes, functional literacy classes, and social education.

Remedial programmes attempt to correct or compensate welfare institution residents who have had either no opportunity for formal education or have received inadequate formal education. The aim is to eradicate illiteracy. The programme extends over a period of six years, corresponding to the formal primary system and accommodates children of different language media, and of different levels of attainment.

Combining education and work

Extension literacy schemes aim at supplementing knowledge gained in the formal school system by children who have sinced dropped out of it.

Functional literacy training is work-oriented, and aims at increasing the employment potential of the trainees. Some of the major trade facilities in institutions for boys are wood-work, metal-work, motor mechanics, book-binding, radio mechanics and agricultural training. For the girls a composite course in tailoring, home science ranging from nutrition to child care, hair dressing and make-up is offered. These courses not only teach the trades and manual dexterity but also inculcate correct attitudes, good work habits, safety measures and rules, concern for productivity and general discipline.

Social education forms an integral part of the overall programme in welfare institutions. Social education is carried out in an informal situation, through group discussions and civic talks by members of the staff or guests. Religious education is an important feature under this programme as a large portion of the boys and girls who are admitted into the institutions face personal and social problems.

8. Other non-formal programmes of vocational and technical education

The Government provides trade and industrial training for prisoners, detained persons and young offenders in Malaysian penal establishments with the aim of rehabilitating them. The main aim of vocational training for these persons is to help them to learn and acquire some useful types of trade and industrial training so that they can, after discharge, become tradesmen and earn an honest livelihood. In most prisons education in the national language and English is designed up to LCE level. Other subjects such as arithmetic, hygiene, history and geography are also taught. Trade and industrial training is generally given only to inmates whose period of sentence exceed 6 months.

MARA too provides technical and vocational training for young persons in its vocational institutes. The Malaysian International Shipping Cooperation provides young persons training in marine and merchant shipping. Many other government departments such as the National Electricity Board, the Malaysian Railways, the Police, the Army, Navy and Air Force provide training in special skills for their own workers.

The private sector plays an important role in providing education and training in skills especially in the engineering, agricultural and commercial fields. Companies large and small train, retrain, or update the skills and knowledge of their employees within their own establishments, or send them for training and education to institutions within and outside the country. Private schools and correspondence schools also run technical and vocational courses especially in engineering trades, secretaryship and marketing.

The Malaysian Trades Union Congress, finally, provides numerous courses for its members. Broadly speaking, trade union and workers education programmes seek to help a worker to acquire a better understanding of his work, environment and social objectives; to promote the development of a worker's natural aptitude and potential for the advancement of his career; and to instil in a worker active interest in the social, economic, educational, cultural and political life of his country.

D. Conclusion

Programmes combining education and work experience have come a long way in Malaysia. It is a far cry from the days when pre-vocational electives were introduced in 1965 and vocational secondary schools set up in 1968. The setting up of workshops and laboratories for Industrial Arts, Home Science and farms for the increasing numbers of students seeking to learn electives has been an enormous and expensive task. The establishment of teacher training colleges to train teachers qualified to teach these electives has also been a formidable and heart-rending task. Nevertheless, the growth in the number of students learning electives has been steady as the figures below indicate:

	Industrial Arts	Agricultural Science	Commerce	Home Science	Total
1969	99,120	59,950	22,490	101,080	282,640
1972	118,550	66,610	43,230	119,370	347,760
1976	146,680	87,350	107,140	180,320	521,490

The total of 521,490 students represents 98.5% of the total enrolment of 529,340 in Forms I, II and III in 1976. However there is room for further growth for not all students have the opportunity to learn at least one

elective and only few schools are able to offer all 4 electives. As well, the number of vocational and technical schools and other training centres can be increased.

Nevertheless achievements to date reflect the government's determination to develop its own expertise and technological infra-structure — an effort which necessarily must begin in the schools. The introduction of the comprehensive and post-comprehensive school system with its emphasis on streaming of students and the development of both intellectual and the manual skills has provided this effort with the necessary foundation. The government has also sought to solve its manpower needs as well as its social and economic problems by providing non-formal education to as many persons as possible outside the school system. It has sought to equip the youths not only with knowledge to enable them to participate in national life, but also with employable skills to play their roles in national and social development.

Figures are unfortunately not available to trace the growth and the extent of opportunities provided in the non-formal sector but the large number of government and non-government bodies providing such opportunities reflects the growing concern of the government and the nation for the problems and potential of the youths.

The approach to educate and train the youths in the school system as well as in non-formal programmes is a sure and effective method of not only solving the country's manpower needs but also of lessening the socio-economic problems associated with unemployment and under-employment.

The equation of the Vocational School Certificate with the Malaysian School Certificate has given vocational school leavers some status - a vital factor in helping to popularize work-oriented education in a society where white collar-jobs are still held in high esteem and where it is generally felt that vocational education should be provided only for the dropouts.

Another factor that may eventually help to further increase the status of vocational or work-oriented education is the fact that students who do well in the Vocational School Certificate Examination can proceed to the Polytechnics and from there to the Technical University. The significance of this second chance or alternative route to higher education has not been fully felt in the country.

The opportunities for dropouts and those in non-formal programmes to re-enter the school system at various points and levels are, however, being increasingly appreciated. Students are able to re-enter the school system at Form IV and Form VI on passing the Lower Certificate of Education examination and the Higher School Certificate examination. The Further Education Classes of the Ministry of Education and similar courses organized by other Ministries help the students directly or indirectly to gain re-entry into the school system after passing the required examinations. Avenues are also available to those who wish to get into institutions of higher learning through private study, night classes, correspondences courses, and the like. These avenues are a useful and important means of ensuring that dropouts can get back into the formal system of education, especially into work-oriented education.

With the growth in industrialization, Malaysia's need for skilled manpower at all levels is increasing. Occupations in the industrial and services sectors will increase at a fast rate as Malaysia's industrialization programmes are stepped up. Shortages of skilled manpower can be a serious constraint to economic growth.

The increasingly complex industrial environment, the rapid pace of technological change and international competition require that Malaysia's work force is highly informed and well trained. The worker of the future must be equipped with the knowledge and resilience to face changing situations. In order to provide such a work force, not only must technical and vocational education be expanded and improved in the formal and non-formal areas but general technical education must also be taught in all schools so that a firm foundation for the training of men and women who can understand and control technological changes in an age in which technology is the main feature of their life can be laid.

Our children are being prepared to play useful roles in tomorrow's world of work and one may expect that education and the world of work will be increasingly linked in the years ahead. The future of work-oriented education in Malaysia thus seems secure and promising. There is a growing feeling that education cannot be separated from the realities of the working life. Schools are generally conscious of preparing students for participation in the world of work and in social living. Education and work experiences will be increasingly combined as more and more schools and centres are developed in both the formal and non-formal sectors in the years ahead.

PART II

Two projects are selected in this report. They are the pre-vocational education programme and the secondary vocational schools programme. Both illustrate how education and productive work are closely linked. They cover a large population group and have been in operation for about ten years.

A. Project I - The Pre-Vocational Education Programme

A short description of this programme has been given in Part I of this report. Four elective subjects - industrial arts, agricultural science, commercial studies and home science - were introduced into the lower secondary schools' curriculum in 1965 when the comprehensive system of education was adopted. The idea of the comprehensive system of education is too well known to be repeated here but in Malaysia it was intended to give a wider spectrum of subject alternatives to pupils who have a diverse and varied range of interest and ability. All the pupils in the lower secondary classes are required to study at least one of these four electives.

Objectives

It is perhaps necessary to look at the general and specific objectives of the electives in order to gain a better understanding of the pre-vocational education programme as a whole. These objectives are:

- To provide the pupils with basic information and knowledge of technical and vocational education and introduce them to the world of modern technology.
- To teach the students some basic theoretical concepts and afford some practical experience in the use of tools and of materials in technical and vocational fields.
- To develop useful habits and attitudes in the students and guide them to select a suitable vocation.

Industrial Arts

Industrial Arts, like the other electives, is an integral part of general education. It is not skill training nor does it attempt to prepare the students for a specific vocation. It concerns itself primarily with the development of useful habits, attitudes and knowledge which contribute to desirable personal traits, and seeks to promote an understanding of and appropriate adjustment to the industrial environment.

The objectives of the Industrial Arts programme are many and varied, namely to assist the students in selecting a suitable vocation; to promote appreciation of industrial activities as they relate to society; to complement classroom instruction through practical application; to impress the student with the concept of the dignity of productive work; to provide opportunities for creative expression; to establish safe work habits; to develop problem solving abilities; to develop cooperative attitudes; to provide experience in the right use of tools and materials; to develop intelligent consumer attitudes through an appreciation of products and services; and to provide experiences conducive to a fruitful use of leisure time.

The content areas of the course are as follows:

Form I	Woodwork I
	Metals I
	Related drafting I
Form II	Electricity I
	Power mechanics I
Form III	Woodwork II
	Metals II
	Related drafting II
	Electricity II
	Power mechanics II

The average time available for actual teaching per year is about 36 weeks. The number of hours available for each Industrial Arts area over the three years of Form I, II and III is roughly as follows:

		Total weeks	Min.per week	Total hours
Form I	Woodwork I) Related Drafting I (wood))	18	160	48

		Total weeks	Min.per week	Total hours
Form I	Metals I) Related Drafting I (metal))	18	160	48
Form II	Electricity I	18	160	48
	Power Mechanics I	18	160	48
Form III	Woodwork I) Related Drafting II (wood))	9	160	24
	Metals II) Related Drafting II (metal))	9	160	24
	Electricity II) Related Inform. (Elect.))	9	160	24
	Power Mechanics II) Related Inform. (P.M.))	9	160	24
	3 years total for Industrial Arts			288

The teaching time of 288 hours represents 10% of the total of 2,880 hours for all subjects in the lower secondary classes for the 3 years.

Industrial Arts laboratories now found all over the country are varied in design and size. They are actually former woodwork and metalwork workshops coverted into Industrial Arts laboratories when the teaching of woodwork and metalwork in the lower secondary classes was discontinued. New laboratories have, however, been built for these schools. These laboratories are large enough to accommodate students learning the five areas of the Industrial Arts subjects.

The main source of teachers for Industrial Arts at the moment is the Technical Teachers' Training College, Jalan Cheras, Kuala Lumpur. Here trainee teachers undergo a two-year course in the five areas of Industrial Arts, Principles of Education, Bahasa Malaysia, English Language, Physical Education and Health Education.

The enrolment of Industrial Arts students at lower secondary level has been rising steadily from 1969, as the figures below indicate:

Year	Enrolment
1969	99,121
1972	118,550
1976	146,680

Agricultural Science

Agricultural Science as taught at the lower secondary level covers a wide variety of agricultural areas. These are:

- Agriculture in Malaysia
- Farm Management
- Soil Science
- Crop Production
- Livestock Production
- Farm Tools and Machinery

Teachers of Agricultural Science in lower secondary schools are usually college trained. They undergo a two year course in the Temenggong Ibrahim Training College, Johor Bahru. In-service courses are also held from time to time to update the teachers' knowledge and skills.

Schools offering Agricultural Science have the following basic equipment:

- Laboratory Equipment
- Field Tools
- Workshop Tools

No special laboratory has been built for this subject. The ordinary science laboratory is used to conduct experiments. To teach Agriculture effectively land is an important factor. Schools use about one half to one acre of land for the school farm.

Agricultural Science is taught for 4 forty-minute periods a week. This is usually broken up into a two-period practicum in the field and two single classroom lessons. The details are as follows:

Subject	No. of weeks	Min. per week	Total hours
Agriculture in Malaysia	4	160	11
Crops and soils	42	160	112
Ornamental horticulture	10	160	27
Livestock	24	160	64
Farm mechanics and safety	10	160	27
3-year total for Agricultural Science			241

Students learning Agricultural Science are also encouraged to form Agricultural Clubs for extra-curricular activities. Teachers are required to organize field trips and educational tours to places of agricultural interest.

The enrolment of Agricultural Science students at lower secondary level from 1969 has been increasing. The steady growth can be seen below:

Year	Enrolment
1969	53,958
1972	66,611
1977	87,350

Commercial Studies

Commerce is included as a part of general education, in order to help students understand the role it plays in society. The aims of teaching Commercial Studies are to arouse the students' interest in business activities; to help students understand how modern society operates and thus help them to become good and useful citizens; to widen their general knowledge and experience; and to provide a foundation for further studies in commerce. The aim of teaching Commercial Studies at this level is not to prepare students for employment.

There are two subject areas, namely Elements of Commerce and Elementary Bookkeeping. Elements of Commerce incorporates the basic functions of business institutions like insurance, banks and other financial houses, and trading activities of wholesalers and retailers. Elementary Bookkeeping teaches students the principles of double entry system of recording business transactions.

The average time available for actual teaching per year is 36 weeks. The following table illustrates the number of teaching hours available for each area over the three years:

	Area	Total weeks	Mins. per week	Total hours
Form I	Elements of Commerce	36	120	72
Form II	Elements of Commerce	36	80	48
	Elementary Bookkeeping	36	40	24
Form III	Elements of Commerce	36	40	24
	Elementary Bookkeeping	36	80	48
	3-year total for Commercial Studies			216

The teaching time of 216 hours represents 7.5% of the total 2,880 hours for all subjects over the 3 years.

The Specialist Teachers Training College is the source of Commerce teachers of the lower secondary schools. Commerce teachers undergo a two-year course at the Technical Teachers Training College.

The enrolment of Commerce students at the lower secondary level has grown over the years as is shown by the figures below:

Year	Enrolment
1969	22,497
1972	43,233
1976	107,140

Home Science

Home Science is taught to girls in the lower secondary schools with the following objectives:

- To expose students to experience in the various aspects of Home Science concerning food, shelter, clothing, health and human relationship.
- To develop a sense of good grooming.
- To help the students develop the right attitudes concerning their resources of income, time, energy, possessions and community facilities.
- To help the students to acquire knowledge and skills and to develop appropriate attitudes towards achieving a happy healthy life for themselves and their family.
- To help equip girls to fulfil their role in a changing society.

The Home Science subject at this level includes cookery and nutrition; needlework and dressmaking; mothercraft and home nursing; and housecraft and laundry work.

The teaching period allocated for this subject is 160 minutes per week. Most of the time is spent on practical work. The details are as follows:

	Subject	No. of weeks	Min. per week	Total hours
	(Cookery) (Housecraft) (First aid)	18	160 (120 for practical, 40 for theory)	48
Forms I-III	(Needlework) (Laundry work) (Mothercraft and child care)	18	160 (120 for practical, 40 for theory)	48

This represents 10% of the total teaching hours.

Practical lessons are carried out in specially designed and fully equipped rooms. The two main work rooms for Home Science are the Cookery and Needlework rooms. Major equipment include refrigerators; electric, gas, and oil cookers including ovens; water heaters; thermostat irons; crockery; cutlery; pots and pans and other household equipment.

The Home Science teachers are trained in the local Teachers' Training Colleges. They undergo a two year course. In-Service courses are held every year during the holidays to keep the teachers up-to-date with Home Science development as well as to upgrade the teaching of this subject.

The enrolment of Home Science students at the lower secondary level has grown over the years:

Year	Enrolment
1969	101,083
1972	119,371
1976	180,320

Continuation at upper secondary level

The electives in the lower secondary schools continue on to the upper secondary level except for Industrial Arts which ends at Form III. There are three commercial subjects in the upper secondary schools, namely Commerce, Commercial Studies and Principles of Accounts. Agricultural Science and Home Science are also taught as continuation of the lower secondary syllabi. The following table shows the enrolment for each of these subjects in the upper secondary schools from 1969 through 1976:

Year	Commerce	Agricultural Science	Home Science
1969	3,670	48	1,040
1970	2,643	30	1,102
1971	4,255	265	1,962
1972	6,084	1,215	3,224
1973	7,788	264	1,501
1974	9,482	677	1,816

Electives at this level are, however, not as popular as at the lower level, largely because students have a wide variety of options to pursue in the science and arts and technical fields.

Results achieved

The teaching of electives, especially at the lower secondary level, has been very effective in spreading some knowledge of technology and the world of work. The fact that they are taught as part of general education has given these subjects respectability and acceptance by pupils, parents and teachers. This has helped considerably to promote general technical education. There is now a growing awareness that such subjects form an important part of a child's education, for they help prepare him for active participation in life. Better pupils are now attracted to this type of education and training.

More and more students are being motivated to proceed to technical and vocational schools as a result of the exposure to the world of work through learning of electives.

The value of general technical education in helping towards governments' efforts to expand technical manpower is being slowly but increasingly recognized. With the rapid changes in technology, production methods and materials, the old idea of training students with specific skills needed for immediate employment is giving way to the need for a new type of worker with greater adaptability and flexibility to meet changing situations. The teaching of electives has given students the breadth of view and the enquiring mind so necessary for the workers of tomorrow.

Also, the teaching of electives has helped children to discover and develop their hidden talents which would have been dormant otherwise.

B. Project II - The Vocational Schools Programme

The secondary vocational schools have a very specific function to perform in providing commerce and industry with manpower equipped with basic skills and knowledge at craftsmanship level. The curriculum relating to the vocational content is kept very flexible and broadbased so that courses can be varied to reflect the changing needs of technology. Vocational education seeks not only to provide and improve basic skills but also to teach basic scientific knowledge which will allow the students as skilled workers later to adapt themselves rapidly to new methods of work and achieve greater proficiency.

Vocational education is provided in four main areas, namely, Engineering Trades, Agriculture, Commerce and Home Science.

The Engineering Trades Courses

Seven trade courses are available at the vocational schools, namely:

- Electrical Installation and Maintenance
- Radio, TV and Electronics Servicing
- Fitting and Machining
- Sheetmetal Work and Welding
- Woodworking and Building Construction
- Motor Mechanics (Petrol and Diesel)
- Air Conditioning and Refrigeration

Teachers for these vocational trades are trained at the Technical Teachers' Training College, Cheras, Kuala Lumpur. They undergo a three year course in each of the trades including industrial training.

The equipment used in Engineering Trades is extensive. Most of it is similar to that used in workshops and industries.

The Vocational Agriculture Course

The Vocational Agriculture Course aims generally to impart agricultural knowledge and farming skills to students. A major portion of the total time is spent in field work related to various farming operations. The course stresses farming skill and farm management practices rather than agricultural theory. In short, the course is aimed at providing students with the knowledge and skills needed for employment at field supervisory level.

Field work is an essential part of the course which covers the following areas:

- Crop Production
- Ornamental Horticulture
- Soil Management
- Livestock Production
- Farm Management
- Farm Tools and Machinery

The sources for the Vocational Agricultural teachers are the University of Agriculture, Serdang and other recognized universities.

Commerce

The aim of this course is to develop skills in typewriting, shorthand, bookkeeping and business correspondence. It is, in other words, meant to develop efficient office workers at clerical level. Subjects under this course are as follows:

- Pitman Shorthand or Bookkeeping
- Commercial English
- Commercial Practice
- Typewriting

The Malay Medium students take shorthand in Malay.

Teachers were mostly trained at the Specialist Teachers Training College at Kuala Lumpur, under a programme called 'Specialist Course'. An additional one-year intensive course is also provided for trained teachers. In January 1972, the training of commerce teachers was shifted to the Technical Teachers Training College, Kuala Lumpur.

Home Science

Objectives of the Vocational Home Science Courses are to acquire knowledge, skills and attitudes in specialized areas of Home Science for employment; to improve living conditions in the family through effective and economic management of family resources, namely money, time and energy; to develop judgement, taste, and ability to select good housing, clothes and consumer goods suitable to family resources; to improve the family health status by learning to plan and prepare nutritive, attractive and delicious meals especially from local dishes; and to develop desirable attitudes towards work, good working habits and discipline.

Combining education and work

The Vocational Home Science Schools offer two main courses, namely:

Course A:

Nutrition
Cookery and cottage industry and catering
Housecraft
Mothercraft and child care
Elements of commerce

Course B:

Needlework and tailoring
Beauty culture and hairdressing
Laundrywork
Elements of commerce

General education in the form of English, Malay, Mathematics, Science, Social Studies (and Religious Knowledge for Muslim students) are also provided. At the end of the second year students will sit for both the practical and theory examinations of the Malaysian Vocational School Certificate.

Teachers for Vocational Home Science are trained at the Specialist Teachers Training College, Kuala Lumpur and Maktab Perguruan Temenggong Ibrahim, Johor Bahru.

Evaluation

The Vocational Schools Programme was started only in 1968 but during its short history of ten years it has played a major role in supplying the much needed skilled manpower.

The indispensable role of vocational education in an age of accelerated development of technology is obvious. Malaysia's industrialization programmes require skilled manpower at all levels and the vocational schools programme is necessary to develop and maintain the infrastructure and technological base.

The vocational schools programmes has also helped to reduce the increasing numbers of unemployed school leavers with only general education.

Although the number of vocational schools is only 23, the enrolment of vocational schools graduates has been steadily increasing over the years. In 1968 there were only

1,260 students while in 1978 the number had increased to 11,000. It is expected that by 1980 the enrolment will be around 15,000.

Vocational schools are becoming more and more popular largely because vocational education as provided in the schools not only trains the student to gain meaningful employment but also develops the full potential of the individual. The training is broad-based and this gives the students greater flexibility in adapting to their work.

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